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FEDERAL COMMUNICATIONS COMMISSION
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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of

Establishment of Rules and Policies for the
Digital Audio Radio Satellite Service in the
2310-2360 MHz Frequency Band

)
)
) IB Docket No. 95-91 ✓
) Gen Docket No. 90-357
)

COMMENTS

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EXECUTIVE SUMMARY

BellSouth Corporation and its subsidiary BellSouth Wireless Cable, Inc. (collectively, "BellSouth") are gravely concerned that the rules recently proposed by XM Radio Inc. ("XM Radio") and Sirius Satellite Radio Inc. ("Sirius"), the two United States satellite Digital Audio Radio Service ("DARS") licensees, will not protect the Multipoint Distribution Service ("MDS"), Instructional Television Fixed Service ("ITFS") and Wireless Communications Service ("WCS") from destructive interference. As such, the Commission should place more stringent restrictions on terrestrial DARS operations than are being proposed by XM Radio and Sirius.

With their recent filings, the DARS licensees have asked the Commission to afford them almost unlimited flexibility to deploy high-power terrestrial transmission facilities throughout the United States. In support of those proposals, Sirius has attempted to demonstrate that the rules being advocated to govern the use of terrestrial repeaters in the 2320-2345 MHz band will adequately protect licensees in the MDS, ITFS and WCS bands. However, as BellSouth establishes herein, the DARS licensees' proposals are not sufficiently protective of the MDS and ITFS bands that BellSouth uses for its existing wireless cable operations, nor of WCS spectrum in which BellSouth is planning to deploy WCS services.

The DARS licensees' proposed use of terrestrial repeaters is very similar to the situation that the Commission faced three years ago when it adopted the Part 27 WCS service rules in GN Docket No. 96-228. There, the Commission recognized that the unrestrained operation of terrestrial WCS facilities in the 2305-2320 MHz and 2345-2360 MHz bands could interfere with MDS/ITFS operations, and adopted a series of power limits, notice, and equipment replacement rules to minimize that risk. Sirius concedes that terrestrial DARS repeaters in the 2320-2345 MHz band pose no materially different risk of interference to MDS/ITFS. Accordingly, BellSouth urges the Commission to protect MDS/ITFS operations by restricting the power level of terrestrial DARS repeaters to 400 watts/MHz peak EIRP and impose on terrestrial DARS licensees the same notice and equipment replacement obligations relative to MDS and ITFS as have been imposed on WCS.

The Commission should also adjust the spectral mask to be consistent with this proposal. An EIRP limitation of 400 watts/MHz will result in a 14 dB improvement in the out-of-band performance of the terrestrial DARS transmitters. Unless the spectral mask is changed, that benefit will not redound to the MDS, ITFS and WCS licensees, who will remain unnecessarily vulnerable to interference. Thus, the Commission should require terrestrial DARS out-of-band emissions to be attenuated an additional 14 dB beyond the attenuation proposed by XM and Sirius.

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COMMENTS

BellSouth Corporation and its subsidiary BellSouth Wireless Cable, Inc. (collectively, "BellSouth"), pursuant to the Commission's January 21, 2000 *Public Notice*,^{1/} hereby file their initial comments in response to supplemental filings recently made by XM Radio Inc. ("XM Radio")^{2/} and Sirius Satellite Radio Inc. ("Sirius"), the two United States satellite Digital Audio Radio Service ("DARS") licensees.^{3/} For the reasons set forth below, BellSouth submits that in order to protect the Multipoint Distribution Service ("MDS"), Instructional Television Fixed Service ("ITFS") and Wireless Communications Service ("WCS") from destructive interference, the Commission should place more stringent restrictions on terrestrial DARS operations than are being proposed by XM Radio and Sirius.

I. INTRODUCTION

With their most recent filings, the DARS licensees have asked the Commission to afford them almost unlimited flexibility to deploy high-power terrestrial transmission facilities throughout

^{1/} See "Satellite Policy Branch Information," *Public Notice* (rel. Jan. 21, 2000).

^{2/} See Supplemental Comments of XM Radio Inc., IB Docket No. 95-91, GEN Docket No. 90-357 (filed Dec. 17, 1999)[hereinafter cited as "XM Radio Supplement"].

^{3/} See Supplemental Comments of Sirius Satellite Radio, IB Docket No. 95-91, GEN Docket No. 90-357 (filed Jan. 18, 2000)[hereinafter cited as "Sirius Supplement"].

the United States. In support of those proposals, Sirius has attempted to demonstrate that the rules being advocated to govern the use of terrestrial repeaters in the 2320-2345 MHz band will adequately protect licensees in the MDS, ITFS and WCS bands. However, as BellSouth establishes below, that attempt is flawed and changes to the DARS proposals are required in order to protect MDS, ITFS and WCS operations from destructive electrical interference.

BellSouth has a vital interest in ensuring that any rules adopted in this proceeding are crafted to protect existing wireless cable operations that utilize the MDS and ITFS bands, as well as BellSouth's planned WCS spectrum deployment. BellSouth holds MDS and ITFS channel rights covering approximately 3.5 million homes in Atlanta, New Orleans, Louisville and several large markets in Florida. The company has already launched digital wireless cable service in New Orleans, Atlanta, and Orlando, and has begun providing that service on a limited basis in Jacksonville and Daytona Beach. BellSouth also operates analog wireless cable systems in Louisville, KY, Ft. Myers, and Lakeland, FL.^{4/}

The DARS licensees' proposed use of terrestrial repeaters is very similar to the situation that the Commission faced three years ago when it adopted the Part 27 WCS service rules in GN Docket No. 96-228. There, the Commission recognized that the unrestrained operation of terrestrial WCS facilities in the 2305-2320 MHz and 2345-2360 MHz bands could interfere with MDS/ITFS operations, and adopted a series of power limits, notice, and equipment replacement rules to minimize that risk.^{5/} Sirius concedes that terrestrial DARS repeaters in the 2320-2345 MHz band

^{4/} In addition, BellSouth holds the MDS/ITFS channel rights to serve Miami, FL.

^{5/} See *Amendment of the Commission's Rules to Establish Part 27, the Wireless Communications Service ("WCS")*, 12 FCC Rcd 3977 (1997)[hereinafter cited as "*WCS MO&O*"].

ose no materially different risk of interference to MDS/ITFS. Accordingly, BellSouth urges the Commission to protect MDS/ITFS operations: (1) by imposing the same 2,000 watts peak equivalent isotopically radiated power ("EIRP") limit on terrestrial DARS repeaters as is applied to fixed WCS operations (adjusted to 400 watts/MHz peak EIRP to reflect the more narrow bandwidth of terrestrial DARS channels); (2) by requiring a terrestrial DARS operator to notify potentially-affected MDS and ITFS licensees before commencing operations; and (3) by requiring terrestrial DARS licensees to replace MDS/ITFS downconverters under the same limited circumstances WCS licensees are required to do.

BellSouth also is the licensee of a substantial portion of the WCS spectrum covering the southeastern United States.^{6/} In total, BellSouth holds 22 of the 128 WCS authorizations awarded by the Commission, for which it paid approximately 45% of the total net bid for WCS spectrum in the Commission's 1997 WCS spectrum auction.^{7/} Two months ago, BellSouth announced that it will be conducting a trial in Houma, LA to test the technical and financial feasibility of utilizing WCS spectrum to provide high-speed, wireless Internet access to rural America. As a WCS licensee,

^{6/} BellSouth holds licenses for all of the WCS spectrum (the 2305-2320 and 2345-2360 MHz) in the Charlotte-Greensboro-Greenville Major Economic Area ("MEA"), the Atlanta MEA, the Tampa-St. Petersburg-Orlando MEA, the Miami MEA, the Louisville-Lexington-Evansville MEA, the Nashville MEA, and the New Orleans-Baton Rouge MEA, is the licensee of three of the four spectrum blocks in the Knoxville MEA, the Jacksonville MEA, the Birmingham MEA and the Memphis MEA, and of two of the four WCS authorizations in the remaining MEAs within the Southeast and Mississippi Valley Regional Economic Area Groups. The Commission has pending before it petitions that, if granted, would authorize BellSouth to partition, disaggregate and/or assign certain of its WCS authorizations to Wireless One, Inc., which petitions are in the process of being modified to reflect the fact that Wireless One, Inc. has recently been acquired by MCI Worldcom, Inc.

^{7/} See "WCS Auction Closes," *Public Notice*, DA 97-886 (rel. April 28, 1997).

BellSouth is concerned that unless the out-of-band emissions limitations imposed on terrestrial DARS facilities are tightened beyond the restriction being proposed by the DARS licensees, WCS licensees and their customers may suffer substantial harm. Therefore, consistent with BellSouth's proposal to restrict the EIRP of terrestrial DARS repeaters to 400 watts/MHz equivalent peak power, the Commission should require terrestrial DARS out-of-band emissions to be attenuated an additional 14 db beyond the attenuation proposed by XM and Sirius.

II. DISCUSSION

A. THE COMMISSION SHOULD EXTEND THE MDS/ITFS INTERFERENCE PROTECTIONS THAT CURRENTLY EXIST IN THE WCS SERVICE RULES TO TERRESTRIAL DARS OPERATIONS

1. *The Commission Should Adopt a 400 Watts/MHz Peak EIRP Limit On Satellite DARS Operations Just As It Did For WCS Operations.*

The satellite DARS licensees urge the Commission to refrain from imposing any restriction on the power levels at which terrestrial repeaters can operate and concede that they plan to transmit at power levels as high as 40 kW EIRP.^{8/} Yet, in so doing, they have ignored the clear and unambiguous determination by the Commission that terrestrial operations in the 2305-2360 MHz band must be restricted to no more than 2,000 watts peak EIRP over the 5 MHz WCS channel bandwidth in order to protect MDS and ITFS operations in the 2150-2162 MHz and 2500-2690 MHz bands.

At the urging of BellSouth and others, the Commission's *WCS MO&O* promulgated rules limiting the WCS fixed, land and radiolocation land stations to 2,000 watts peak EIRP to prevent

^{8/} See XM Supplement, at 4-5, Appendix A, p. 4-5 (proposing a variety of terrestrial repeaters, some operating with EIRPs as high as 10-20 kW per carrier); Sirius Supplement, at 3 (proposing terrestrial repeaters that would operate at EIRP levels as high as 40 kW or 46 dBW).

interference with MDS/ITFS reception.^{9/} In pressing for a power restriction on WCS, wireless cable operators demonstrated that WCS operations are likely to cause blanketing interference to subscriber equipment that has been widely deployed for use in MDS/ITFS systems.^{10/} The Commission agreed, ruling:

After careful consideration of this issue, we find that the public interest will be best served by setting limits on WCS operating power. We will therefore restrict WCS fixed, land and radiolocation land stations to 2,000 watts peak EIRP and WCS mobile and radiolocation stations to 20 watts EIRP. Setting maximum power levels on WCS operations will provide MDS/ITFS equipment manufacturers and service providers with the necessary certainty regarding the potential WCS environment to enable them to design and purchase more robust receiving installations, including better designed downconverters.^{11/}

The text of Sirius' supplemental comments would have the Commission believe that only MDS and ITFS operations that are within 15.3 meters of a terrestrial DARS repeater will be jeopardized.^{12/} However, the "Assessment of Interference Potential from Sirius Terrestrial Transmitters into MDS, MMDS and ITFS Systems in Frequency Bands Near 2 GHz" annexed to

^{9/} See *WCS MO&O*, 12 FCC Rcd at 3983-84. Indeed, this concern was first raised by BellSouth prior to the adoption of the WCS service rules; BellSouth put evidence into the record in GN Docket 96-228 demonstrating that blanketing interference would result from high power WCS signals in close proximity to MDS/ITFS receivers. See *Ex Parte* Statement of BellSouth Corporation, GN Docket No. 96-228 (filed Jan. 30, 1997).

^{10/} See Petition for Expedited Reconsideration of the Wireless Cable Association International, Inc., GN Docket 96-228 (filed Mar. 10, 1997). Blanketing interference is defined as "[t]he action of a powerful radio signal or interference in rendering a receiving set unable to receive desired signals." IEEE Standard Dictionary of Electrical and Electronic Terms, The Institute of Electrical and Electronic Engineers, Inc., STD 100-1972. In the *WCS MO&O*, the Commission found that blanketing interference would be caused by WCS transmitters because many types of MDS/ITFS downconverters now in the field have minimal frequency selectivity in order to be operational in both the 2150-2162 and 2500-2690 MHz bands. See *WCS MO&O*, 12 FCC Rcd at 3982-83.

^{11/} *WCS MO&O*, 12 FCC Rcd at 3983-84.

^{12/} See Sirius Supplement, at 10-11.

those comments as Exhibit 2 paints a far more chilling picture. At pages 9-10, Sirius *concedes that terrestrial DARS operations can cause blanketing interference due to downconverter overload to receivers located within 2048 meters of a terrestrial repeater.*^{13/} The Commission should note, moreover, that Sirius' analysis underestimates the risk of interference. The most obvious, for example, is that the Sirius analysis assumes a terrestrial DARS transmission power of 30 dBW/MHz.^{14/} However, Sirius is proposing that the Commission not impose any maximum EIRP on terrestrial DARS repeaters.^{15/} In addition, the analysis performed by Sirius fails to include any additional margin on the overload level. As was done in the filings that led the Commission to adopt the Part 27 restrictions on WCS to protect MDS/ITFS, good engineering practice requires the addition of at least 6 dB of margin to the 1 dB compression point in order to ensure reliable linear operation. Adjusting the analysis presented by Sirius in Table 5.2-1 accordingly would establish the overload level at -42 dBW, not at -36 dBW. As a result, the minimum separation distance between a DARS terrestrial repeater and an MDS receive site doubles from 2048 meters to 4096 meters, or approximately 2.5 miles. Thus, the potential for interference is even greater than Sirius admits.

Sirius attempts to downplay the significance of the fact that block downconverter overload will cause interference to MDS and ITFS operations by stating that "[t]he easiest way to overcome this problem is to use some sort of filtering across the Sirius Satellite Radio transmit band."^{16/} What Sirius ignores, however, is that the Commission expressly found in the WCS proceeding that new

^{13/} See Sirius Supplement, at Exhibit 2, p. 9-10.

^{14/} See *id.*

^{15/} See *id.* at 3.

^{16/} *Id.* at 9.

filters “could not be economically installed in existing units due to the design and construction of these downconverters.”^{17/}

In short, the DARS licensees’ proposal gives rise to essentially the same scenario that led the Commission to impose a 2,000 watt or 400 watt/MHz peak EIRP limit on WCS operations. Unless an equivalent power limitation (adjusted to reflect the narrower bandwidth of terrestrial DARS channels) is imposed on terrestrial DARS repeaters, substantial harm could befall MDS and ITFS licensees across the country. To avoid that harm, the Commission should limit terrestrial DARS operations to 400 watts/MHz peak EIRP, which is the same restriction on a power spectral density basis that is imposed on WCS operations.

2. *The Commission Should Require Satellite DARS Operators To Notify MDS/ITFS Licensees Prior To Commencing Transmissions And To Replace MDS/ITFS Downconverters Which Are Located Within A Terrestrial Repeater’s Free Space Power Flux Density Contour of -34 dBW/m² Where Certain Other Conditions Are Met.*

In the *WCS MO&O*, the Commission adopted a policy, now found at Section 27.58 of the Commission’s Rules,^{18/} that imposes an obligation on each WCS licensee to notify neighboring MDS and ITFS licensees prior to commencing operations, and to bear full financial responsibility for remedying interference to MDS/ITFS block downconverters under certain strictly delimited circumstances.^{19/} Neither Sirius nor XM has demonstrated why the same obligations should not be imposed on terrestrial DARS licensees.

^{17/} *WCS MO&O*, 12 FCC Rcd at 3983.

^{18/} See 47 C.F.R. § 27.58.

^{19/} See *WCS MO&O*, at 3984-85.

The Commission's *WCS MO&O* recognized that the 2,000 watt peak EIRP limitation on WCS operations would not fully protect existing MDS and ITFS installations and that it would be fundamentally unfair to MDS and ITFS licensees to bear the cost of replacing equipment that had been designed to operate in a pre-WCS (and pre-terrestrial DARS) environment and whose useful life was cut short by a Commission rulemaking for another service.^{20/} As a result, the Commission held:

Considering these circumstances, ..., we believe it is appropriate and equitable to shift to WCS licensees some of the cost and responsibility for remedying interference to MDS/ITFS operations.^{21/}

However, the Commission also sought to encourage the deployment of new MDS/ITFS equipment that would require fewer restrictions on users of other spectrum.^{22/} Thus, the Commission ruled that WCS operators would be required to bear full financial responsibility to replace MDS/ITFS downconverter equipment only if all of the following circumstances are present:

- (1) the complaint of interference is received by the WCS licensee prior to February 20, 2002;
- (2) the MDS/ITFS downconverter was installed prior to August 20, 1998;
- (3) the WCS operation transmits at 50 or more watts peak EIRP;
- (4) the MDS/ITFS downconverter is located within a WCS transmitter's power flux density contour of -34 dBW/m²; and

^{20/} *Id.* at 3984.

^{21/} *Id.*

^{22/} *See id.* at 3984.

(5) the MDS/ITFS customer or licensee has informed the WCS licensee of the interference within one year from the initial operation of the WCS transmitter or within one year from any subsequent power increase at the WCS station.^{23/}

Particularly given Sirius' concession that its terrestrial repeaters are likely to cause block downconverter overload, there is no reason why the same obligations should not apply equally to terrestrial repeaters employed by satellite DARS operators in the 2320-2345 MHz band.

B. THE COMMISSION SHOULD ADJUST THE SPECTRAL MASK PROPOSED BY XM AND SIRIUS TO REFLECT THE 400 WATT/MHZ PEAK EIRP LIMITATION.

In their supplemental comments, the DARS licensees propose to attenuate their emissions into the WCS bands by at least $75 + 10 \log(p)$ dB at the band edge shared with WCS and to drop their power another 20 dBW further away.^{24/} However, because the Commission must impose a 400 watts/MHz limitation on peak EIRP for the reasons set forth in the preceding section of this pleading, the spectral mask proposed by Sirius and XM is no longer appropriate. As a result of the reduction in peak EIRP, there will be a 14 dB improvement in the out-of-band performance of the terrestrial DARS transmitters. Unless the spectral mask is changed, that benefit will not redound to the MDS, ITFS and WCS licensees, who will remain unnecessarily vulnerable to interference.

Exhibits 1 and 2 of the most recent Sirius filing include analyses of the C/I interference the proposed DARS terrestrial repeaters would provide to a variety of MDS and WCS systems. The analyses are generally performed correctly, except that no additional fade margins are included for the desired signals. By not including fade margins in the analysis, the Sirius approach degrades the ability of the MDS or WCS system to offer the level of link availability necessary to provide a high-

^{23/} 47 C.F.R. § 27.58(a).

^{24/} See XM Supplement, at 5; Sirius Supplement, at 5-7.

quality service. In order to achieve the requisite degree of link availability over long distances, margins of 20 dB or more may be necessary. Incorporating this additional attenuation in the Sirius analysis results in unacceptable C/I in many cases. However, given that the power of the DARS terrestrial repeaters must be reduced to 400 watts/MHz, but that the relative attenuation of the filters and the linearity of the transmitters can stay the same, emissions in the MDS and WCS bands will be reduced. In other words, since the power has been reduced 14 dB, the minimum attenuation requirements should be increased by 14 dB. This would result in the attenuation becoming $89 + 10 \log(P)$ for the emissions in the WCS band and $109 + 10 \log(P)$ for the emissions in the MDS band. At these levels of attenuation, the required fade margins can be added back into the C/I calculations and the link availability for the MDS and WCS significantly improved.

Therefore, BellSouth urges the Commission to adjust the spectral mask set out in Figure 1 of the Sirius Supplement by requiring an additional 14 dB of attenuation.

III. CONCLUSION

For the reasons set forth above, BellSouth requests that the Commission: (1) restrict the power level of terrestrial DARS repeaters to 400 watts/MHz peak EIRP; (2) impose on terrestrial DARS licensees the same notice and equipment replacement obligations relative to MDS and ITFS

as have been imposed on WCS; and (3) require terrestrial DARS out-of-band emissions to be attenuated an additional 14 dB beyond the attenuation proposed by XM and Sirius.

Respectfully submitted,

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February 22, 2000

CERTIFICATE OF SERVICE

I, Stephanie Sieber, hereby certify that the foregoing Comments was served this 22nd day of February, 2000, by depositing a true copy thereof with the United States Postal Service, first-class postage prepaid, addressed to the parties listed on the attached list unless otherwise noted:

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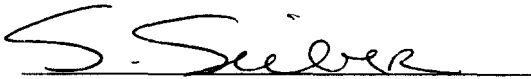
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